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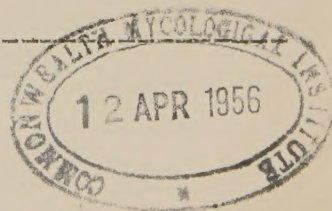
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For private circularion to plant pathologists in Australia.

Please do not abstract.



PLANT DISEASE NOTES.CEREALS AND GRASSES.HEAD SMUT OF MAIZE:

During the spring of 1955, a severe outbreak of head smut of maize (*Sphacelotheca reiliana*) occurred in the Richmond district, near Sydney. Two varieties, Victory and Emblem, were being grown and whilst Emblem was completely free of the disease, Victory was heavily infected, ears and tassels both being attacked. Self-sown plants of Victory (from last season) which came up in the crop of Emblem, were also heavily smutted. Moreover, Emblem sown on land that carried a smutted Victory crop the previous season was free of smut. Both varieties were sown at the same time.

The high susceptibility of Victory to head smut was previously noticed on the North Coast during an outbreak in the 1951-52 season.

All the factors concerned in the development of a severe head smut outbreak like the present one are not known but it has been observed that a high percentage infection is often associated with fairly high temperature and low soil moisture conditions at and just after sowing.

- J. WALKER.

Department of Agriculture,
Sydney.

POWDERY MILDEW OF BARLEY - PHYSIOLOGIC RACES:

Physiologic specialization of the powdery mildew pathogen of barley (*Erysiphe graminis hordei* Marchal) was studied at Sydney University during 1954. Two physiologic races were identified as races 3 and 7 on the basis of infection results on the differential varieties of Newton and Cherewick. These results are listed below:-

	<u>Infection types recorded with:</u>	
	<u>Race 3</u>	<u>Race 7</u>
Goldfoil C.I. 928	0	4
Black Hull-less C.I.666	4 -N	1* ^{NN*} -N
Chevron C.I.1111	1	1
Heil's Hanna 3	4	4
Peruvian C.I.935	4	1* - 2
Nepal C.I.595	3* - 4	1 - 1*

* N signifies a conspicuous necrosis.

These results are consistent with those recorded by Newton and Cherewick for these races.

Race 3 was found in natural infections on barley seedlings growing in the glasshouse at Sydney University. This race has previously been identified in New South Wales and South Australia and is apparently widely distributed.

Race 7 was collected in August 1954 from a natural infection on seedlings of the variety Goldfoil growing in the University glasshouse. Since Goldfoil was highly resistant to race 3 it was immediately evident that a new race had been found. Race 7 is differentiated from race 3 chiefly on its ability to attack all those varieties, such as Goldfoil, which depend on the M_{1g} gene for resistance. Other pathogenic differences were noted, for example the variety Abyssinian Intermediate C.I.5808 was susceptible to race 3 but proved to be resistant to race 7.

Race 3 was identified in collections from Sydney University, Castle Hill, and Waite Institute, Adelaide, in 1954, and from Grafton in 1955.

Race 7 has only been found in collections from Sydney University.

Collections of barley mildew from Western Australia have not yet been studied but during an epiphytotic in that State in 1955, Atlas 46 was reported to be resistant to mildew. As this variety is resistant to race 3 but susceptible to race 7 it is apparent that race 7 was not involved.

Department of Agriculture,

- K.S. McWHIRTER.

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FIELD AND FODDER CROPS:WART DISEASE OF SUBTERRANEAN CLOVER:

A disease of subterranean clover found in Western Australia recently has been examined by Associate Professor N.H. White of the University of Sydney who considers the cause to be Urophlyctis trifolii. There appears to be no previous record of this pathogen on subterranean clover.

The disease occurred at Talbot Brook one hundred miles east of Perth. It was found on both Dwalganup and Mt. Barker varieties and was apparently more serious on Dwalganup. It was not reported until the last week of November and therefore no opportunity was afforded to follow the progress of the disease during the growing season. The farmer merely observed that growth was good in the early part of the season but "stopped" in September when the disease was first noticed.

Warts occurred on stems, leaf stalks and flower stalks. They were roughly spherical in shape and ranged from an extremely minute size up to 2 mm. in diameter. Where warts occurred in high concentration coalescence resulted in a thickened and "beaded" appearance of the stems which sometimes became twisted and distorted. The warts contained numerous brownish spherical resting sporangia about 40 microns in diameter. An examination of dried stem specimens collected in late December indicated that the sporangia were released by a gradual disintegration of the warts.

How widespread this disease is in subterranean clover pastures or how long it has been present is not known. It is not improbable that it has been present in trace amounts for some time and as a member of a moisture loving group of fungi has only reached conspicuous proportions this season due to exceptionally heavy rainfall which persisted until the first week of November.

In the normal short seasons of 1953 and 1954 the subterranean clover pasture in question was described by the farmer as "Good".

Department of Agriculture,
PERTH.

- H.L. HARVEY.

ROOT LESION Nematodes on subterranean clover.

Roots of a sample of subterranean clover from Piangil, Victoria, taken in September 1955, were found to be heavily infested with Pratylenchus thornei Sher and Allen.

Affected plants in the field were severely stunted, with leaves showing patterns suggestive of a mineral deficiency. It is probable that leaf symptoms depend upon local conditions, and that these patterns are not invariably associated with nematode attack. The roots showed many small brown lesions containing large numbers of Pratylenchus.

Infested soil was collected to establish a bush house culture of P. thornei. Sub. clover seedlings germinated in this soil were very quickly invaded by the nematodes and developed typical lesions.

Pratylenchus thornei was first recorded in Australia by Seinhorst, who found it in 1955 in soil from plots at the Waite Institute, Adelaide. However it has not previously been reported as a plant parasite in this country, though Thorne found it attacking seedling wheat in Utah.

C.S.I.R.O.
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- M.R. SAUER.

RUST OF CRIMSON CLOVER.

Recently a specimen of crimson clover (Trifolium incarnatum) showing heavy rust infection was received from Taree, on the North Coast of New South Wales. Only a few infected plants were seen in an area of over an acre. Both uredospores and teleutospores were present and this rust seems to fall within the species Uromyces Trifolii.

Within Uromyces trifolii, there are several sub-species. U. trifolii fallens has uredospores with 4-7 germ pores, usually scattered, whilst U. trifolii trifolii-repentis, U. trifolii subterranei and U. trifolii hybridi have 2-4 germ pores, usually equatorial. The present rust on crimson clover falls in this latter category. As far as can be determined, U. trifolii hybridi has not been recorded in Australia and so the crimson clover rust would appear to be either U. trifolii trifolii-repentis or U. trifolii subterranei. Both these sub-species have been recorded on crimson clover, the first by Arthur (Manual of the Rusts of the United States and Canada, P.304, 1934) the second under artificial inoculation by Latter (Proc.Linn.Soc. N.S.W. 77: 5-6: 337-356, 1953).

This is the first record of rust on T. incarnatum in New South Wales and probably in Australia.

-J. WALKER.

Department of Agriculture,
Sydney.

VEGETABLES.CONTROL OF DOWNY MILDEW OF ONIONS:

Following on the spray experiment for the control of downy mildew of onions last year (R.F. Doepel, A.P.D.R. 7:3:28, 1955) a further trial was conducted this season on an early planted crop.

Two fungicides, copper oxychloride and zineb, were tested with and without Triton B.1956, an additional wetting and spreading agent.

The spray strengths used were:-

Copper oxychloride 31/3rd lb. per 100 gallons.
 Zineb..... 1½ lb. per 100 gallons.
 Triton BI956..... 6 fl. oz. per 100 gallons.

Unsprayed plots were left as a control.

Commencing on 13th September, 1955, five spray applications were made to the experimental plots at 10 to 14 day intervals depending on weather conditions.

Mildew developed in all plots and caused much dying back of the leaves. An assessment was made of damage to the foliage in each treatment plot a week prior to harvesting the onions.

All plots were harvested at maturity and the onions were cured for a week before being topped and weighed.

The zineb sprayed plots gave significant increases in yield (at the 0.1% level) above control and copper oxychloride plots. There was no significant difference between control oxychloride treatments.

The plots sprayed with zineb were much more vigorous and showed significantly less damage from mildew attack than the control plots (Zineb at the 5% level; zineb + Triton at the 1% level). There were no significant differences between copper oxychloride and control treatments or between copper oxychloride and zineb treatments.

The zineb + Triton spray was also tested on a seed crop of onions. Seven applications were made at 10 to 14 days intervals.

The unsprayed control block had 57% of seedstalks affected by mildew and many of these had fallen over at the site of attack. In the zineb sprayed plot only 7% of seedstalks were affected.

TRANSMISSION OF LETTUCE BIG-VEIN DISEASE:

During the past winter attempts were made to transmit the lettuce big-vein disease, which is well established in some Melbourne market-gardens, by both aphid and sap inoculation.

In the first instance adult *Myzus persicae* were starved overnight and then given a short feed (10-15 seconds duration) on big-vein affected lettuce leaves. Test plants were seedling Imperial D Lettuce grown in separate metal containers in steam sterilized soil. A total of 20 plants was inoculated with 10 aphids per plant. There were 20 control plants uninoculated. The plants were grown in an insect-proof field cage for one month after inoculation and then in the open to guard against the possibility of symptom masking. The experiment was commenced on 19th May and until the time of writing (2nd September) symptoms have not been recorded on any plant.

In a second experiment, commenced on 26th June, roots from four big-vein affected lettuce were washed free of soil and macerated individually with phosphate buffer. Imperial D seedlings grown as above were dusted with 600 mesh aloxite and finger inoculated with each macerate. The inoculum was washed off with tap-water immediately after inoculation. Equal numbers of controls were inoculated from the roots of healthy lettuce. This experiment was also maintained in an insect-proof field cage. Regular observations were made for about six weeks, but big-vein symptoms did not appear. On 30th August, when it was decided to terminate the experiment, big-vein symptoms were observed on a number of plants. The extent of these symptoms suggested that they had been present for more than a week. The writer had not looked at the plants during that period. The results of the experiment are recorded in Table 1.

Table 1. Infections recorded on Imperial D lettuce sap-inoculated with root macerates from big-vein affected lettuce.

Inoculum No.	<u>Infections recorded.</u>	
	Big-vein inoculum	Healthy plant inoculum
1	4/5*	0/5
2	4/5	0/5
3	2/5	0/5
4	0/5	0/5

* The numerator refers to the number of infections and the denominator to the number inoculated.

It is realized that the above results do not demonstrate that the big-vein virus is sap-transmissible. Special precautions will have to be taken in future experiments, to ensure that the inoculum on the leaves does not make contact with the soil.

However, the results do indicate that symptoms of big-vein disease develop very slowly, and that it will be necessary to keep inoculated plants under observation for at least two months, and under fairly low temperature conditions to guard against the possibility of symptom masking.

Department of Agriculture,
Melbourne.

-L.L. STUBBS.

A TOBACCO NECROSIS VIRUS AND BIG VEIN DISEASE OF LETTUCE:

A disease answering to the description of big-vein of lettuce has been recognized in Victoria since the winter of 1954. The symptoms of the disease were at first confused with those of mosaic.

Following a report by Fry (N.Z.J. Sci. Tech. Sect. A, 34 : 224-225, 1952) of a possible association between a tobacco necrosis virus and lettuce big vein disease, an examination was made of the roots of affected and healthy lettuce. Initially, roots were collected from 10 big-vein and 10 apparently healthy plants from a Dandenong market garden with a light sandy loam soil. Three Brown Beauty bean plants and 3 lettuce seedlings were sap-inoculated from each source plant. Symptoms were not recorded on any of these plants. The inoculations were made on 7th September, 1954.

In May, 1955, the disease appeared in an experimental plot of lettuce on heavy soil of basaltic origin at Burnley. Bean and lettuce seedlings were again inoculated with buffered (pH7) extracts from the roots of 4 healthy and 4 diseased lettuce. Each inoculum was replicated three times on both lettuce and beans.

Reddish brown local lesions appeared on the leaves of all 3 beans inoculated from 1 lettuce plant which did not show big-vein symptoms. Symptoms did not appear on beans inoculated from other plants and none of the lettuce developed symptoms. When inocula prepared from single lesions on the above beans were rubbed separately on leaves of further Brown Beauty bean plants, numerous small reddish brown lesions developed within 72 hours. The virus did not become systemic.

This evidence suggests that the virus is a tobacco necrosis virus, but its identity has yet to be confirmed.

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Melbourne.

- L.L. STUBBS.

FUSARIUM FOOTROT OF CUCURBITS - SEED TREATMENT:

Gries (Connecticut A.E.S. Bull 500, 1946) showed that seed transmission of the Fusarium footrot disease of cucurbits (*F. solani* (Mart.) App. & Wr. f. *cucurbitae* Snyd. & Hans.), could occur as a result of entry of the fungus into the fruit from the soil. Seed infection which arose in this way was both internal and external. Further external seed contamination resulted from the inclusion of infected fruit in the fermentation vat. Seed transmission of the fungus has also been detected under local conditions. (R.J. Conroy, J. Aust. Inst. Agr. Sci. 19:2: 106-108, 1953).

In an attempt to eradicate seed borne infection, Gries treated Early Prolific Summer squash seed in hot water at 55°C for 15 minutes. and at 60°C for 5 and for 10 minutes. Although, at each treatment level, the percentage infection was reduced substantially, the viability of the seed was markedly impaired. However, as it was found that a 15 minutes soak in mercuric chloride 1:1000 was satisfactory only against external seed contamination, Gries considered that a hot water treatment would be preferable when it was essential to reduce the infection in a seed lot.

In 1951, a batch of pumpkin seed (Var. Queensland Blue) was obtained from a grower at Pennant Hills (N.S.W.). This seed was the residue of a lot which had been used to plant a crop in which 25% Fusarium footrot was present. The seed was treated in the manner indicated below. Each treatment consisted of three series of one hundred seeds. After treatment the seed was planted in sterilized soil and the percentage of footrot which developed in the resultant seedlings was noted. The results are set out below.

Treatment	Series 1		Series 2		Series 3		Average	
	Ger ^m %	Footrot %	Ger ^m %	Footrot %	Ger ^m %	Footrot %	Ger ^m %	Foot % rot
1. Hot Water 55°C 15 Min	75	0	86	2	91	1	84	1
2. Mercuric chlor- ide soak 1: 1000 15 min	62.7	12	68	2	79	5	69.9	7.7
3. (1) followed by (2)	70.7	0	69	0	40	0	59.9	0
4. Control - un- treated	55	51	69	19	83	17	69	29

These results also indicate that the hot water treatment, either alone or followed by the mercuric chloride soak, markedly reduces seed contamination. The mercuric chloride soak alone permitted a higher carryover, almost certainly of internally seed borne infection. Hot water treatment alone did not depress germination in this case, but some depression occurred when the treatments were combined.

It is considered that treatment of cucurbit seed along these lines to control the seed borne phase of the disease would be worthy of further trial when opportunity offers. If a proper time-temperature relationship could be worked out for the hot water treatment, the disease could be eradicated from seed without inimical effects on germination. If this did not prove to be the case and some depression in germination resulted, the planting of a few additional treated seeds per hill would be worthwhile solely from the point of view of disease control.

Department of Agriculture.
Sydney.

- R.J. CONROY.

FRUITA PSOROSIS-TYPE VIRUS OF CITRUS:

In the last year several records have been made of a psorosis-like condition in Southern Queensland citrus orchards. The symptoms of this condition are similar to those described by Dr. Lilian Fraser (A.P.D.R. 7:1:10, 1955) but the effects on the tree are more severe. This is probably due, however, to considerable secondary invasion by such organisms as Phomopsis citri during the abnormally wet seasons of 1954-55.

The extent of the damage varies from one branch of one Washington naval orange tree on the Maroochy Experiment Station to several hundred Joppa and Valencia orange trees on a Maryborough orchard. No leaf pattern has been observed to date but the new growth this spring will be carefully watched.

The distribution of the disease, as suggested by Dr. Fraser, is indicative of spread by an insect vector.

Department of Agriculture
Nambour, Queensland.

- B.L. OXENHAM

ORNAMENTALS.ANTIRRHINUM RUST:

Antirrhinum rust (*Puccinia antirrhini*) was first recorded in Western Australia in September, 1955 (A.P.D.R. 7:4:54, 1955).

The number of locations where the disease has been found now totals nine. Eight of these are within a radius of 20 miles of Perth and one is at Bridgetown, about 150 miles south of Perth. Every occurrence but one was in a home garden. The exception was a commercial cut flower garden in which a large area of plants was virtually destroyed by rust. The origin of the outbreak has not been discovered.

Department of Agriculture,
Perth.

H.L. HARVEY.

PASMO DISEASE OF ORNAMENTAL FLAX LINUM TRIGYNUM:

Extensive stem lesions and die-back occurred on a four year old yellow flowering flax plant, Linum trigynum, in August 1955, at Pennant Hills.

The lesions resembled those of pasmo disease of linseed flax, but no fruiting body of any fungus occurred on the lesions. Platings of the tissue lesions produced a fungus which developed pycnidia and spores after a period of six weeks which were identical with Septoria linicola, the imperfect stage of Mycosphaerella linorum (Wr.) Garcia-Radu, the cause of pasmo disease of linseed flax. Suspensions of these spores were sprayed onto seedlings of linseed flax, Linum usitatissimum, and typical pasmo symptoms developed on the inoculated plants.

The diseased plant of L. trigynum had not previously shown any signs of the disease. Other plants, growing in the same garden but at other locations, that were derived from the diseased plant the previous year, did not show any symptoms of the disease. It is concluded that infection by air-borne inoculum took place in the current season. No record of pasmo on this species of flax could be found in the literature.

N.H. WHITE
and
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MISCELLANEOUS PLANTS.STEM ROT OF GINGER:

During the 1954-55 growing season a new disease of ginger (Zingiber officinale) was recorded in Southern Queensland. It was termed "stem rot" and made serious inroads into most ginger plantations in the Nambour district.

The symptoms consist of a marginal yellowing of the lower leaves followed by a gradual chlorosis of the whole plant and rotting of the pseudostem at ground level. Lesions usually develop simultaneously in the rhizomes which may rot out completely. It may also cause a breakdown of ginger "seed" (rhizomes) in storage or transport.

Isolation and reinoculation work revealed the causal organism to be a species of *Fusarium* as yet unidentified. The disease first appeared in the yellow Chinese strain of ginger and is thought to have been introduced with planting material from China. Inoculations showed the white variety grown for many years in Queensland to be equally susceptible and this was subsequently confirmed by spread in the field.

Department of Agriculture.
Nambour.

-B.L. OXENHAM

PESTALOTIA AS A WOUND PARASITE ON EUCALYPTUS SALIGNA:

During September and October, leaf and twig lesions occurred abundantly on Eucalyptus saligna growing at Pennant Hills. Black histoid galls occurred on the terminal shoot and lateral twigs of seedling plants. No fruiting bodies or spores could be found associated with these lesions. On plating of both leaf and twig lesions, Pestalotia sp, and Phoma sp. were consistently isolated.

The pathogenicity of these isolates was tested on leaves of seedling E. grandis and E. saligna, by atomising spore suspensions on needle pricked and undamaged leaves. Necrotic lesions developed only on wounded leaves sprayed with conidia from the Pestalotia isolates. Pestalotia was re-isolated from these lesions.

The occurrence of these charcoal like histoid galls on the twigs of Eucalyptus spp. on the eastern coast of Australia is thought to be associated with insect oviposition. The positive results obtained from wound inoculations with Pestalotia lends support to this view.

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and

N.H. WHITE.
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MISCELLANEOUS NOTES.BEAN ANTHRACNOSE - ISOLATES WANTED:

At the present time investigations on various aspects of bean anthracnose are being carried out at the Biological Branch. Identification of strains of the causal fungus, Colletotrichum lindemuthianum, from various areas is being made and the author would be grateful for isolates (or diseased material from which isolates can be obtained) from all parts of Australia. This survey will be assisted considerably if the following information could be provided for each isolates:-

1. Date of isolation (or collection).
2. Place diseased specimen obtained.
3. Variety of bean affected.

All material should be addressed to the author, Biological Branch, Department of Agriculture, Box 36, G.P.O., SYDNEY

- J. WALKER.

Department of Agriculture,
Sydney.

